

AP 117 OSD 使用说明书

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前言

AP117 OSD 视频叠加板可以把飞行信息叠加到视频图像上。操作者可以通过显示器看到飞行的各种信息，比如飞行高度，飞行速度，飞行航向，返航航向等情况。OSD 是 FPV 飞行必不可少的设备。AP117 OSD 可以连接 FY-21AP，FY-3ZT 和 GPS 模块。

AP117 OSD 可以自适应输入视频信号。整个自适应过程大约在 2S 内完成。

工作状态说明：

接好电源后，OSD 工作指示灯将常亮。等待有视频输入后，将自动检测输入视频的制式。检测出相应的视频信号后，会在屏幕上显示对应的制式。当 OSD 接收到 FY-21AP，FY-3ZT 或者 GPS 模块所发送的信号后，工作指示灯将进行闪烁。

一旦适应好输入视频的制式后，即使视频信号中断，OSD 也有叠加内容的输出。

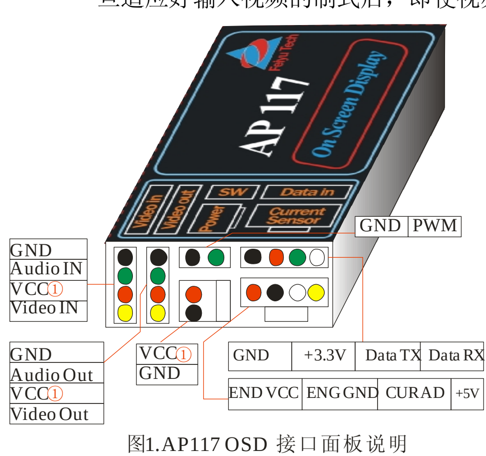


图1.AP117 OSD 接口面板说明

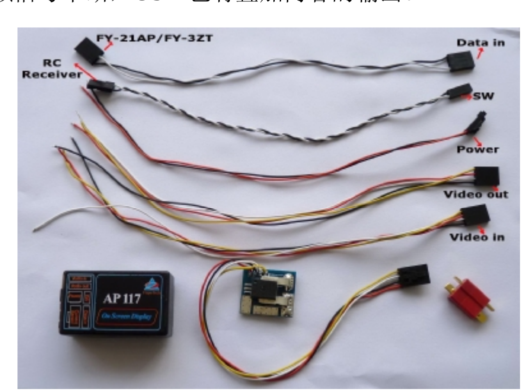


图 2. 配件图

① 注意：在图 1 中,三路"VCC"端口在本 OSD 内部是连接在一起的，因此只需接一路"VCC"，切不可同时接多路电源，否则会引起电源短路损坏 OSD 和其他设备。建议单独为 OSD 供电，此时就不需要再从 FY-21AP 模块获取供电。

AP117 OSD 各接口名称

名称	说明
Video in	摄像头或者视频输入接口
Video out	叠加后的视频输出--可连接到视频发射机的输入端或视频显示设备
SW	连接 RC 接收机的开关通道用来控制视频叠加显示
Power	OSD 视频叠加板和摄像头以及视频发射机的供电电源
Data in	FY-21AP/FY-3ZT/ GPS 的数据接口
Current Sensor	连接电流传感器的接口，测量动力电池的电压和电流

Video in 各接线明细说明

GND	连接到摄像头供电电源的 GND
Audio IN	音频输入（连接到摄像头的音频输出）
VCC	连接到摄像头的供电电源的 VCC (已经和 Power 的 VCC 连接)
Video IN	视频输入（连接到摄像头的视频输出）

Video out 各接线明细说明

GND	连接到视频发射机供电电源的 GND
Audio out	音频输出（连接到视频发射机的的音频输入）
VCC	连接到视频发射机供电电源的 VCC (已经和 Power 的 VCC 连接)
Video out	视频输出（连接到视频发射机的视频输入）

SW 各接线明细说明

GND	连接 RC 遥控接收机电源的 GND
PWM IN	连接 RC 遥控接收机用于控制叠加的开关通道的信号端口

Power 各接线明细说明

GND	连接给 OSD 控制板供电电源的 GND
VCC	连接给 OSD 控制板供电电源的 VCC（DC 6V-16V）

Data in 各接线明细说明

GND	连接 FY-21AP 数据输出口或者 GPS 模块的 GND
+3.3V	给 GPS 模块供电，连接 GPS 模块时用 (连接 FY-21AP 和 FY-3ZT 时不连接)
DATA TX	连接 FY-21AP/FY-3ZT 数据输出口的 RX1 或者 GPS 模块的 RX
DATA RX	连接 FY-21AP/FY-3ZT 数据输出口的 TX1 或者 GPS 模块的 TX

Current Sensor 各接线明细说明

名称	说明
+5V	+5V 供电输出，给电流传感器供电（黄色）
CUR AD	连接电流传感器的信号输出端（白色）
ENG GND	连接动力电池的负极（黑色）
ENG VCC	连接动力电池的正极（红色）

Current sensor:

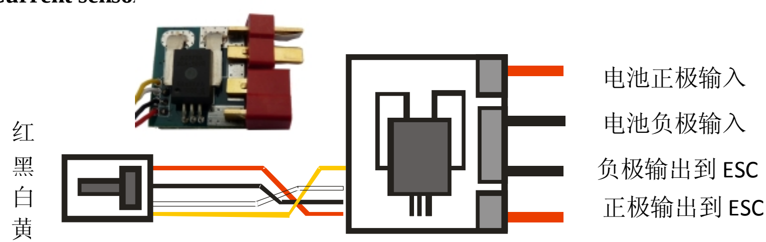


图 3.电流传感器

应用框图

AP117 OSD 可以直接和 FY-21AP、FY-3ZT 的数据输出接口或者 GPS 模块的输出接口连接，把飞行数据叠加到视频信号上。

提示：图 4 中，虚线框内的模块表示可选任意其中一个模块连接。

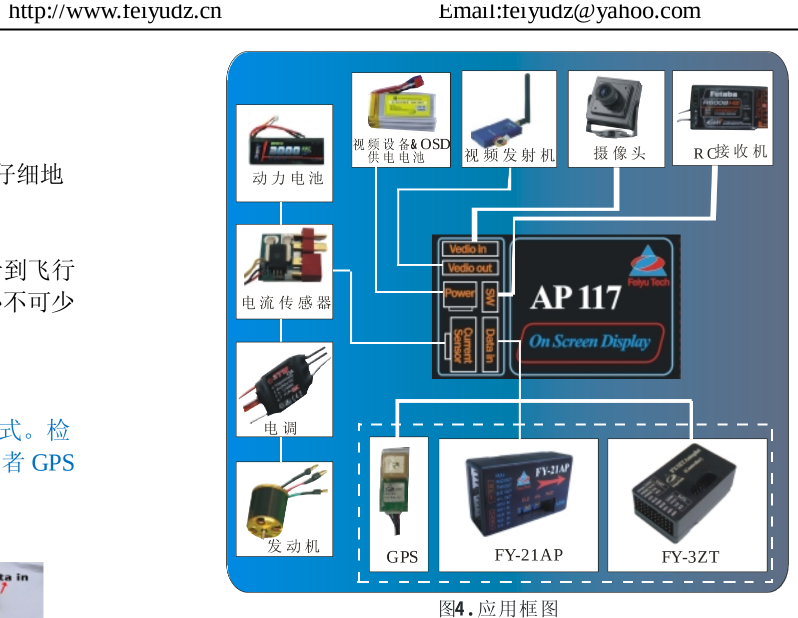


图4.应用框图

界面介绍

OSD 界面信息包括如下表:

1	姿态测量误差系数 （见提示）	11	定位使用的卫星颗数
2	GPS 速度 （单位:km/h）	12	动力电池的电流（单位：A）
3	飞机姿态俯仰角(单位：°)	13	距离地面的高度（单位：m）
4	飞机姿态横滚角（单位：° ）	14	地平线显示
5	飞机的经纬度坐标（格式:dddmm.mmm）	15	飞行的航向（单位：° ）
6	飞行时间（格式:mm.ss）	16	转向返航点的角度(单位：°)
7	飞行模式	17	工作温度（单位：℃）
8	与起飞点的距离（单位：m）	18	图传的电池电压（单位：V）
9	动力电池电压（单位：V）	19	动力电池消耗的电量（单位：mA/h）
10	高度下降或者上升的速率（单位：m/s）		

提示：姿态测量误差系数是一个评估 FY-21AP 或者 FY-3ZT 当前的姿态测量情况的一个系数。正常情况下为 0，最大值为 1000，如果该系数在飞行过程中持续上升到 1000 说明 FY-21AP 或者 FY-3ZT 不符合自动控制的要求，只能全手动飞行(RC 模式)。这种情况多属于设备的安装不符合减震要求，可能需要检查设备的安装情况，做更多的减震工作。

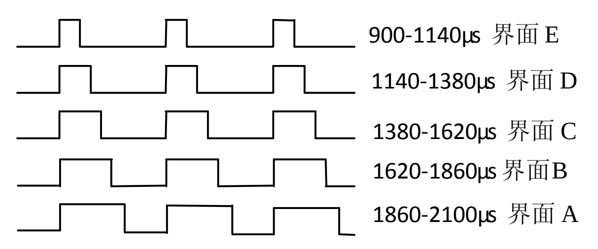
FY-21AP 或者 FY-3ZT 的飞行状态说明：

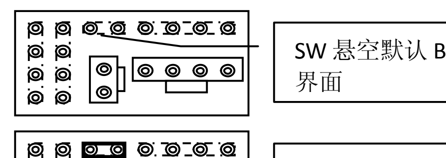
名称	说明
RC	手动飞行
ABM	自动平衡模式
FAF	定高飞行模式(FY-21AP)，航线飞行（FY-3ZT）
RTL	自动返航模式
ACM	自动盘旋模式

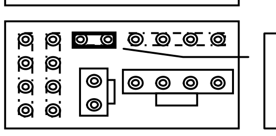
l 显示模式选择

OSD 可以使用一个接收机的一个通道来控制切换 OSD 显示界面，共有以下 5 种界面选择，他们由控制通道的信号 PWM 信号来决定当前显示的是那一种界面。如果不需要切换界面，可以不连接这个控制通道，这时候将 OSD 的 SW 接口悬空将默认使用界面 B，如果使用短路跳线帽短接 SW 接口将默认使用界面 C。

PWM 脉宽信号	900-1140µs	1140-1380µs	1380-1620µs	1620-1860µs	1860-2100µs
显示模式	E 界面	D 界面	C 界面	B 界面	A 界面
备注	关闭全部叠加信息	精简模式	带雷达功能的默认界面	带姿态显示的默认界面	叠加所有信息

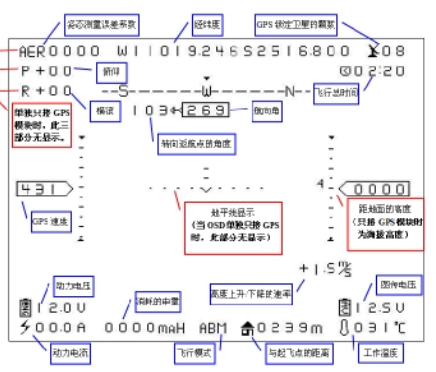






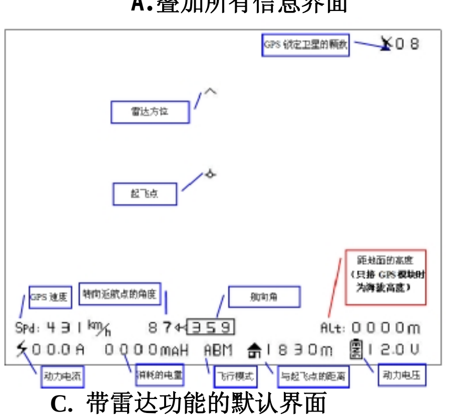
SW 用跳线短接默认 C 界面

l 界面显示说明如下：

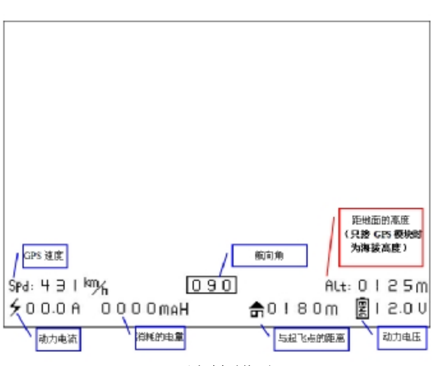


A.叠加所有信息界面

B．带姿态显示的默认界面



C. 带雷达功能的默认界面



D. 精简模式

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AP 117 OSD operation manual

Dear customers:

Hello!Thank you for puchasing the AP117 OSD of Guilin Feiyu Electronic Technology Co, Ltd. In order to achieve full potential and safe operation of this product, please carefully read this manual prior to installation.

Preface

The AP117 OSD overlays flight telemetry information onto your video image. The telemetry information displayed includes altitude, flight speed, flight direction, and home direction.The AP117 can be connected to the FY-21AP and FY-3ZT systems to display autopilot telemetric data, or to a GPS receiver to display positioning data.

AP117 automatically adapts to either PAL or NTSC video input. The adaptive processes within about 2S.

Working status explanation:

After connecting the power supply, the indicator LED light will be activated. The AP117 will automatically detect the incoming video (NTSC or PAL).The "NTSC" or "PAL" will overlaid on the screen when the video signal is formatted. If receive signal from FY-21AP FY-3ZT or the GPS module, the working indicator of AP117 OSD will begin to flash.

Once the input video is detected even if there is interruption to the video signal, the telemetry data of the AP117 will continue to be transmitted via the video stream.

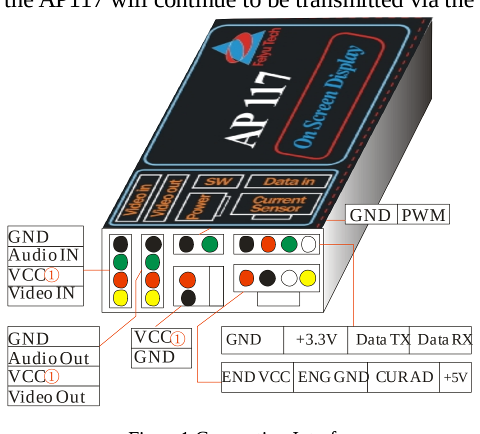


Figure1.Connection Interface

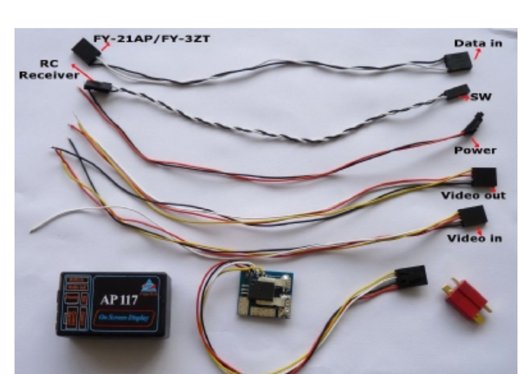


Figure2.Parts list

① 1. DANGER: The three "VCC" ports (positive) for ***Video In***, ***Video Out*** and ***Power In*** are all inter-connected. Therefore you are allowed to connect ONE input voltage only. **DO NOT input more than one power supply or damage to the OSD will occur.**

2. It is recommended to power the OSD independently to ensure a clean video display.
3. Note that power to the OSD is not supplied by the FY-21AP module.

List of Interfaces

PORT	Connection Description
Video in	Camera or video input port
Video out	OSD Overlaid video output, connect to video transmitter or video screen
SW	RC receiver switch input to control OSD display
Power	OSD video overlay board and camera and video transmitter power supply.
Data in	FY-21AP/FY3ZT/GPS data interface
Current Sensor	Current sensor input for measuring the battery voltage and current.

Detailed description of the "Video in" port

GND	Connect to the camera GND
Audio IN	Audio input (Connect to the audio output of the camera).
VCC	Connect to camera's power supply "VCC". (Note: Power is supplied from the OSD to the Camera. Do not input any other power supply through this port or damage will occur).
Video IN	Video input (Connect to the camera video signal output).

Detailed description of the "Video out" port

GND	Connect to video transmitter GND
Audio Out	Audio output (Connect to audio input of the video transmitter).
VCC	Connect to video transmitter power supply input "VCC". (Note: Power is supplied from the OSD to the video transmitter. Do not input any other power supply through this port or damage will occur).
Video Out	Video output (connect to video transmitter video input).

Detailed description of the "SW" port

GND	Connect to the power "GND" port of the RC receiver.
PWM	Connect to the signal port of your RC receiver (you need to designate to a free channel).

Detailed description of the "Power" port

GND	Connected to the power "GND" that supply to the OSD control board.
VCC	Connect to the power "VCC" that supply to the OSD control board(Safe input range: DC6V to 16V) Note: this power supply is sent directly to your Video Camera and Video Transmitter. E.g. if you are using a 12 volt Video Camera and Transmitter, the input voltage should also be 12 volt.

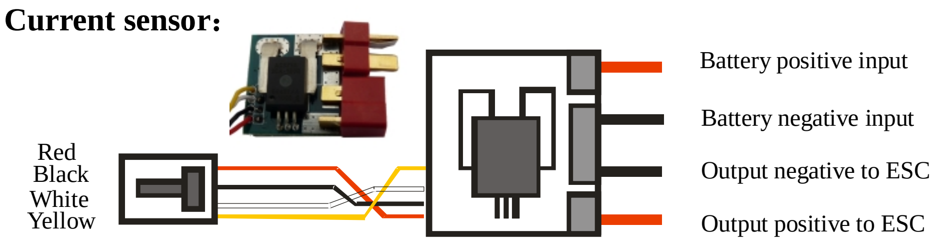
Detailed description of the "FY-21AP/GPS(Data in)" port

GND	FY-21AP GND ,or the GND of the GPS
+3.3V	Use only to supply power to the FY-GPS module . (**DO NOT** connect this port to the FY-21AP or the FY-3ZT).
Data TX	Connect to the "RX1" data output port of the FY-21AP/FY-3ZT,or the "RX" port of the GPS module.
Data RX	Connect to the "TX1" data output port of the FY-21AP/FY-3ZT,or the "TX" port of the GPS module.

Detailed description of the Current Sensor port

Name	Introduction
+5V	+5V power supplied to the current sensor from OSD (Yellow)
CUR AD	Connect to the current sensor output signal (White)
ENG GND	Connect to battery negative (Black)
ENG VCC	Connect to battery positive (Red)

Current sensor:



Application diagram

A P117 OSD can directly connect to the data output port of FY-21AP or FY-3ZT , or separately connect to the output port of GPS module,and then overlay the flight data information to the video signal.

Note：in the **Figure4** the modules in the imaginary line frame means that you can choose any one of these modules to connect .

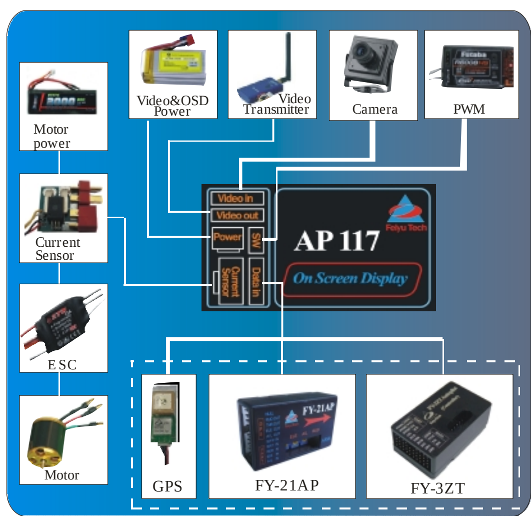


Figure4.Connection Schematic Diagram

Interface introduction

The telemetry data is as bellowing:

1	Attitude measurement error coefficient （refer to the prompt）	11	The quantity of satellite used for positioning
2	GPS speed (Unit: km/h)	12	Power battery current (Unit:A)
3	The pitch angle of the plane (Unit deg)	13	Relative altitude (Unit : m)
4	The roll angle of the plane (Unit deg)	14	Horizon position display
5	Current latitude and longitude of the plane (Format: "dddmm.mmm")	15	The angle of turning to the return point (Unit: deg)
6	Total flight time (Format: "mm: ss")	16	Course angle of flight (Unit:deg)
7	Flight mode	17	Operating temperature(Unit: ℃)
8	Distance to take-off Point (Unit : m)	18	The battery voltage of the video transmitter (Unit:V)
9	Power battery voltage (Unit:V)	19	The battery power consumed (Unit: mA / h)
10	Climb rate (Unit:m/s)		

Error Coefficient Assessment（Attitude measurement error coefficient assessment）

1. Attitude measurement error coefficient is an assessment (ECA) of the aircraft attitude as measured by FY-21AP or FY-3ZT.
2. "0" value is normal, maximum value is "1000".
3. The higher the ECA the more error in autopilot attitude control.
4. If this coefficient continues to increase to 1,000 in the flight, this indicates the FY-21AP or FY-3ZT do not meet the requirements of automated flight, so flight control will be transferred back to you (manual flight or RC mode).
5. This is usually caused by installations that result in high vibrations or shock to the FY21AP or FY3ZT. You will need to check or adjust the autopilot installation to reduce vibration.

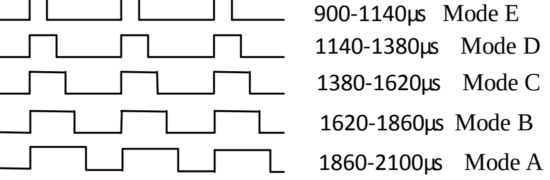
Introduction for the flight State of FY-21AP or FY-3ZT

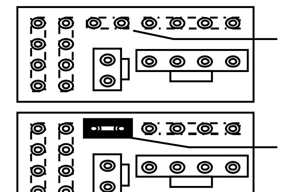
Name	Introduction
RC	Manual Flight. Autopilot deactivated.
ABM	Auto balance mode
FAF	For FY-21AP:Fixed Altitude flying mode; for FY-3ZT:Air route fly mode
RTL	Auto Return Mode
ACM	Auto Circle Mode

- **Display Modes**

The OSD can be controlled to show different desiplay informations via one spare channel of your radio Rx. There are 5 optional desplay modes controlled by the different PWM signals. **You can use default mode if you do not want to change the display modes.Mode B is default when the SW connector left unconnected.Mode C is default when a jumper is used in the SW connector.**

PWM Signal	900-1140μs	1140-1380μs	1380-1620μs	1620-1860μs	1860-2100μs
display mode	Mode E	Mode D	Mode C	Mode B	Mode A
Items	No informations displayed	Brief Mode	Default Mode with radar function	Default Mode With artificial horizon	All informations displayed

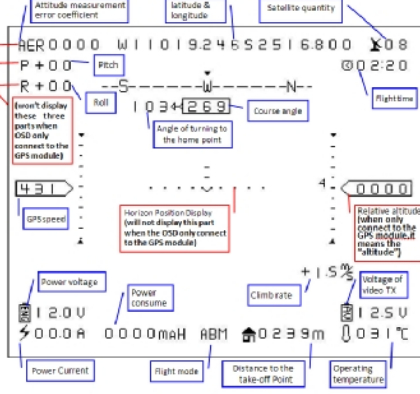




Mode-B is default when SW left unconnected.

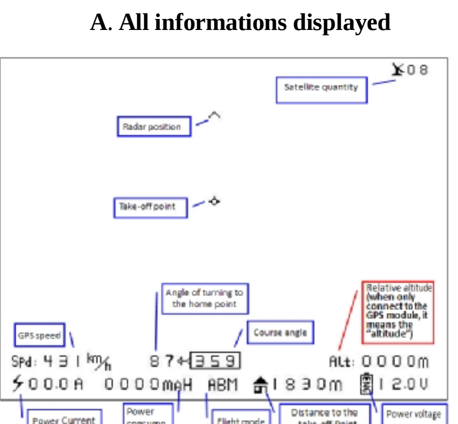
Mode-C is default when using a jumper.

- **The modes shown as below:**

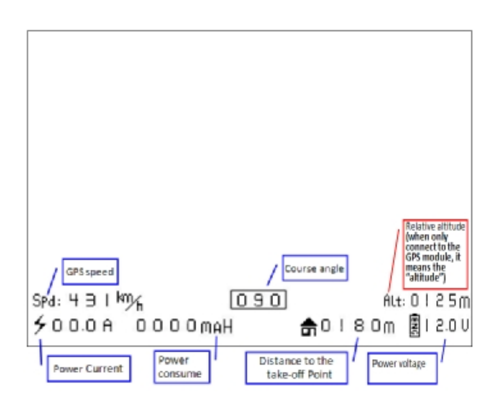


A. All informations displayed

B. Default Mode With artificial horizon



C. Default Mode with radar function



D. Brief Mode

Note: We reserve the right to change this manual at any time!